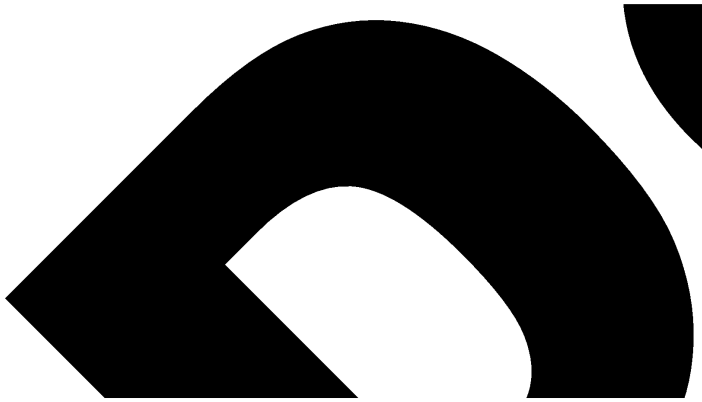

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DIRECTORATE OF
INTELLIGENCE

Intelligence Memorandum

India-Pakistan: The Eastern Waters Problem

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
November 1968

INTELLIGENCE MEMORANDUM

India-Pakistan: The Eastern Waters Problem

Summary

Despite increasing objections by Pakistan, New Delhi is moving rapidly ahead to complete by 1971 its Farakka barrage project which will divert to India some of the Ganges River water now flowing through Pakistan. Last May, talks on a technical level between the two countries on sharing the Ganges water were resumed after a six-year hiatus, but there has been almost no progress and Pakistan is now demanding talks on the ministerial level. New Delhi, which is spending $200 million to solve Calcutta's water problem, almost certainly will not agree to any substantial reductions in the amount of water it now plans to divert. The Pakistanis, however, insist that if a satisfactory agreement is not reached with India they will take the issue to some international forum.

The Farakka barrage project involves damming the Ganges River before it enters Pakistan and diverting some of the water to the Hooghly River, which now is the major route to the sea for heavily industrialized West Bengal and its capital, Calcutta. The Hooghly is rapidly becoming a silt-laden stream, and the passage of oceangoing ships has become increasingly treacherous. Consequently, the port of Calcutta has become grossly inefficient, with extremely high

Note: This memorandum was produced solely by CIA. It was prepared by the Office of Economic Research and was coordinated with the Office of Current Intelligence and the Office of National Estimates.

costs and lengthy delays. Without the introduction of additional water, there is no hope for improvement, and India insists that the Ganges is the only possible source. The heavily polluted, highly saline river is also Calcutta's prime source of drinking water, which adds to an already appalling health problem in one of the world's most miserably crowded cities.

Pakistan strongly objects to India's diversion plans without a prior agreement on sharing the flow. India and Pakistan disagree on estimates of the Ganges flow. According to Pakistan's estimates, the diversion would leave little if any flow during the dry season and would prevent implementation of plans for large-scale irrigation of the dry-season rice crop. These irrigation plans are the principal basis of the program for achieving and maintaining self-sufficiency in rice production in East Pakistan. According to Indian estimates, the planned diversion would leave enough flow to cover part, but by no means all, of Pakistan's irrigation plans. No independent estimates exist.

If Pakistan's worst fears are realized, there are alternative sources of water it can tap within the country, although probably none as easily or as cheaply as the Ganges. In this event, Pakistan would almost certainly turn to the West, or possibly the Communists, for aid in developing these alternate sources.

The Origin of the Problem

1. As a result of the 1947 partition of the Indian subcontinent into the independent states of India and Pakistan, the Ganges now rises within the boundaries of present day India but flows through East Pakistan to the Bay of Bengal. Since the partition, Pakistan and India have intermittently attempted to resolve the dispute over sharing the Ganges water, but discussions up to now have been limited to occasional exchanges of data and presentations of claims and counterclaims. In this situation, India has moved unilaterally to divert the Ganges flow.

2. The current dispute centers on the Ganges, but there are two other large river systems in the subcontinent's northeast, the Brahmaputra and Meghna, which also flow first through India and then Pakistan (see Figure 1). Sharing the waters of these rivers could eventually cause more problems. Together, these three systems form one of the world's largest river networks whose deltas include almost all of East Pakistan and part of India in an area about the size of Florida. The rivers are vital to the region's agriculture, which depends on the annual river flow, and to commerce -- especially in East Pakistan -- which depends on inland waterways for transportation.

India's Problem is Calcutta

3. India bases its claim to the Ganges water on a critical water shortage which threatens to disrupt the economy of West Bengal and its capital, Calcutta. This region contains more than 20 percent of India's industry. It produces about one-third of India's metal products, 40 percent of its iron and steel, and at least 25 percent of its transport equipment, engineering tools, electrical machinery, and scientific equipment. The important traditional industries, such as textiles, on which much of India's export trade depends, also are well represented -- more than 95 percent of India's jute manufacturing capacity is in Calcutta. Almost all of these activities have been hurt in one way or another by the water shortage.

4. Calcutta, India's most important port, lies 126 miles inland from the Bay of Bengal on the Hooghly

River (see Figure 2) and serves a hinterland containing more than one-third of the country's population and extending from northeast India on the Chinese Communist border in the east to New Delhi in the west. In 1966 the port handled 41 percent of India's exports and 28 percent of its imports, by value. Almost all jute manufactures and 80 percent of the tea exports, which together account for more than 30 percent of India's export earnings, are shipped from Calcutta. But the port is in trouble. The Hooghly, because its flow has been reduced over the years, now is brackish and silt-laden, with shifting sand bars and a channel that is extremely difficult to navigate, and the situation is rapidly becoming worse. More than a billion cubic feet of silt are dredged annually. Generally, oceangoing vessels take three days to reach Calcutta, with much of the time spent waiting on the tide, and there are few days when ships drawing more than 25 feet of water can reach port.

5. The degeneration of the Hooghly River has been a primary factor in making the port of Calcutta grossly inefficient and costly to use. Calcutta's share of India's foreign trade tonnage has declined from almost 40 percent in 1951 to less than 20 percent in 1966. In the last three years, traffic has averaged about 11 million tons annually, and this may be Calcutta's limit. With plans for a substantial growth of export-oriented industry in West Bengal, the government has had to begin building a new port at Haldia, some 56 miles downstream, to handle the expected new traffic. Haldia, with a deep-water approach from the sea, is designed primarily to handle large bulk carriers -- ore, oil, and grain -- leaving Calcutta free to handle more general cargo. The completion of Haldia was originally scheduled for 1970, but it is now doubtful if even the first stage, including only seven of the planned 47 berths, will be finished in 1971. Moreover, a new railroad and a motor road to connect Haldia and Calcutta, initially planned for completion in 1969, are far behind schedule. Even after this new port is completed, Calcutta is expected to continue handling at least its present volume of traffic.

India - East Pakistan: Major Rivers

Figure 1

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India: Ganges-Hooghly River Development

Figure 2

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6. The Hooghly River is also the city's primary source of water, but the polluted water now is unfit for human consumption and unsatisfactory for industrial uses. Calcutta's water supply intake at Palta, 15 miles above Calcutta, has a saline content far above the limit deemed safe for human consumption. As a result, the city has turned more and more to wells and other secondary sources of water for its population. These sources, too numerous for sanitation control, add to the serious public health problem in what is already one of the world's most miserably overcrowded cities.

Ships on the Hooghly River at Calcutta

Boats Stranded in the Mud on the Hooghly River at Low Tide

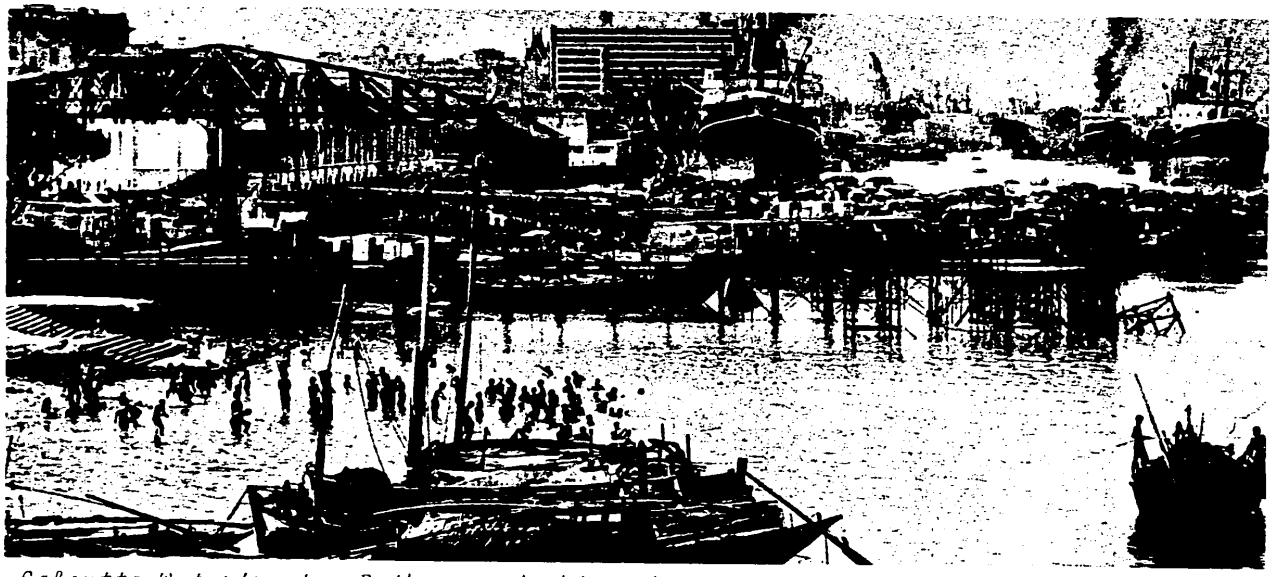
India's Plan to Divert the Ganges

7. With Calcutta's need so pressing and with joint development of the Ganges out of the question, India in 1964 unilaterally began constructing a barrage one and one-half miles in length at Farakka only ten miles upstream from the point where the Ganges crosses the Pakistan border. The barrage will divert Ganges water through a 26.5-mile canal to the Bhragirathi River, which eventually joins with smaller streams to become the Hooghly River north of Calcutta (see Figure 2). By adding a large flow of Ganges water to the Hooghly, India hopes to achieve marked improvement in shipping to and from Calcutta and also to end the threat to Calcutta's economy posed by the present water shortage.

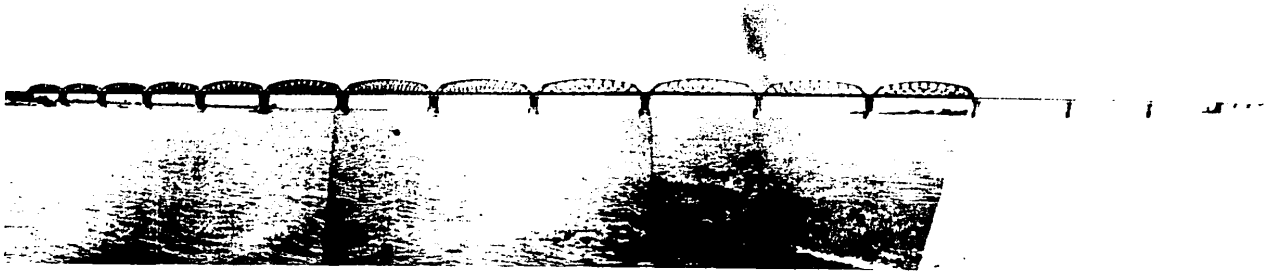
8. Although plans to divert Ganges water to Calcutta were bruited about as early as a century ago, a decision to go ahead was not made until 1961, and actual construction began only in 1964. By mid-1968, about two-thirds of the barrage had been built, and the project could be completed by late 1970. Although no foreign country is directly involved, much of the equipment and machinery were purchased under various foreign aid programs. The original cost estimate of $65.8 million proved extremely low, and current estimates place the project's cost slightly in excess of $200 million. The project is aimed chiefly at solving Calcutta's problems, but will provide other benefits as well. Inland shipping in West Bengal's numerous streams and canals will be improved. The canal connecting the Ganges and downstream Bhragirathi will lower shipping costs between the port of Calcutta and the region along the Ganges. A rail and road crossing of the Ganges will be built atop the barrage, some 63 miles closer to Calcutta than the nearest present bridge at Monghyr. This will improve transportation to and from West Bengal and Assam which has been seriously hampered by Pakistan's refusal since 1965 to allow India to use the extensive inland water system of East Pakistan.

Pakistan's Position

9. Pakistan's greatest concern is that the Farakka barrage will preempt its plans to build a



Calcutta Waterfront - Bathers and ships share the polluted waters of the Hooghly River, which provides two-thirds of the city's drinking water and, despite chemical treatment, is "a sure source of a whole catalogue of gastrointestinal infections."



The Hardinge Bridge over the Ganges at East Pakistan

4 million acre irrigation project that would help East Pakistan become self-sufficient in food production. This large scheme, covering an area equivalent to 15 percent of East Pakistan's cropped area, would provide water for the dry-season rice crop. This crop, which now accounts for only 5 percent of East Pakistan's total rice production (there are two crops during the wet season, June-September) could be substantially increased with adequate irrigation. The irrigation scheme would also insure a more reliable supply of water for wet-season crops. Pakistan believes that completion of the Farakka barrage and subsequent reduction of the Ganges flow will increase silting and eventually make the river bed so shallow that flooding will become more extensive during the wet season and river transport will become considerably more difficult. Rawalpindi is also concerned that the barrage will lower the water table in East Pakistan and reduce the efficiency of tubewell and low-lift pump irrigation.

10. The extent of the potential damage to Pakistan's interests is uncertain. Data on the flow of the Ganges is incomplete, and the two countries disagree as to how much flow would remain after the planned Indian diversion. Data on water flow of the Ganges, collected at Hardinge Bridge, about 100 miles downstream from Farakka, is used by both India and Pakistan to support their conflicting claims. Firm information on the Ganges flow at Farakka is not available. India claims that other streams and runoff add between 18,000 and 20,000 cubic feet per second to the Ganges flow between Farakka and Hardinge Bridge. Pakistan rejects this argument, maintaining that the flow at both points is about the same (see the table). The residual flow (after Indian diversion) for both party's estimates is sufficient to meet Pakistan's needs during the wet season but falls short during the dry season. But Pakistan could still undertake a fairly large dry-season irrigation program if the Indian estimates are right, while according to the Pakistani estimates there would be virtually no water available for increased irrigation.

11. Whatever the actual flow of the Ganges may be at Farakka, there is little doubt that the Pakistanis are right when they assert they would be

better off without any diversion of the Ganges flow. It is less clear, however, that the Ganges is as vital to the country as Rawalpindi suggests. There are numerous other rivers which Pakistan could develop, although probably none could be harnessed as easily or as cheaply as the Ganges. The largest is the Brahmaputra, which enters Pakistan from northeast India and has a flow that is more than twice that of the Ganges. Other smaller streams include the Meghna-Surma system, the Tista, and the Karnaphuli. Neither country has plans to develop the Brahmaputra or the Meghna system. If Pakistan had to develop these alternate sources of water it would almost certainly turn to the West, or possibly to the USSR, for economic assistance. Pakistan, however, has built a hydroelectric dam on the Karnaphuli in the Chittagong Hills and plans to build a barrage on the Tista in the North Bengal Plain.

Prospects

12. Whether or not Pakistani fears are justified is of little moment to India, determined as it is to begin diverting the Ganges flow as soon as the Farakka barrage is finished. The volume of water New Delhi will actually divert will depend on what Calcutta's needs are finally determined to be. India might reduce its water diversion slightly if serious talks with Pakistan get under way and result in an agreement on sharing the river's flow. In May 1968, discussions between the two countries on a technical level did resume after six years, but there was no forward movement. Even if talks are held on a ministerial level, as Pakistan demands, it is almost certain that India, which is spending almost $200 million on the Farakka scheme, will insist on diverting enough water to solve Calcutta's pressing water shortage.

13. The absence of an agreement would further exacerbate Indo-Pakistani relations. Emotions in East Pakistan run high on the Eastern Waters issue, and the East Pakistanis claim that the barrage is more important to them than Kashmir is to West Pakistan. The government of Pakistan, already faced with serious complaints about income disparity and second-class status for East Pakistan, is under pressure to effect an agreement with India. The

Pakistanis have made it clear that if a satisfactory solution is not achieved through bilateral negotiations with the Indians, they intend to raise the issue in some international forum.

Ganges Flow Data a/

Thousand Cubic Feet per Second

Indian Position	Average April Mid-Dry Season Flow		
	High	Mean	Low
Flow at Hardinge Bridge	105	70	45
Flow at Farakka b/	85	50	25
Less diversion by barrage c/	20 to 40	20 to 40	20 to 40
Flow after diversion	45 to 65	10 to 30	0 to 5
Plus flow added d/	20	20	20
Amount available for Pakistan	65 to 85	30 to 50	20 to 25
Less Pakistan's current needs	5	5	5
Surplus or (-) deficit	60 to 80	25 to 45	15 to 20
Less Pakistan's planned additional needs	44	44	44
Surplus or (-) deficit	*16 to 36*	*-19 to +1*	*-29 to -24*

Ganges Flow Data a/
(Continued)

Thousand Cubic Feet per Second

Pakistani Position	Average April Mid-Dry Season Flow		
	High	Mean	Low
Flow at Farakka and Hardinge Bridge e/	105	70	45
Less diversion by barrage c/	20 to 40	20 to 40	20 to 40
Amount available for Pakistan	65 to 85	30 to 50	5 to 25
Less Pakistan's current needs	5	5	5
Surplus or (-) deficit	60 to 80	25 to 45	0 to 20
Less Pakistan's planned additional needs	44	44	44
Surplus or (-) deficit	*16 to 36*	*-19 to +1*	*-44 to -24*

a. Based on a 29-year study of the Ganges flow, measured at Hardinge Bridge.
b. The flow at Farakka is equal to the flow at Hardinge Bridge, less the 20,000 cubic feet per second that India claims is added between the two points by runoff and tributary streams.
c. Farakka barrage can divert from 20,000 to 40,000 cubic feet per second of Ganges flow.
d. Water India claims is added between Farakka and the Hardinge Bridge.
e. The flow at Farakka is assumed by Pakistan to equal the flow at Hardinge Bridge -- that is, no water is added between Farakka and Hardinge Bridge.